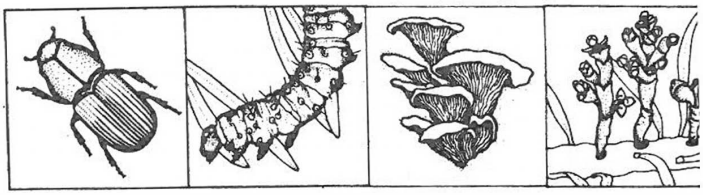
Forest Insect & Disease Management



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REGIONAL SUMMARY OF FOREST INSECTS AND DISEASES, 1979

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INTRODUCTION: The USDA Forest Service is responsible for conducting detection, evaluation, prevention, and suppression of forest insects and diseases on lands of all ownerships in the Region. Detection is accomplished by either surveillance by field-going personnel or planned surveys (usually by air). Evaluations consist of gathering, analyzing, and interpreting biological data on which to base a decision. Prevention is the treatment of an area in suc a way as to exclude pests. Suppression is the actual reduction or elimination of pest numbers by any feasible method.

Prevention or suppression strategies include various combinations of cultural, biological, chemical, or regulatory techniques to reduce the impact of insects and diseases in an environmentally acceptable way to a level commensurate with values. This approach is known as Integrated Pest Management (IPM). Federal/ State Cooperative Pest Management Agreements assist both Idaho and Montana in carrying out an aggressive IPM program on State and private forest lands.

This report is a summary of insect and disease conditions in the Region during 1979. A more detailed report will be published later this year.

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INSECTS

Mountain Pine Beetle 1/

The area covered by the mountain pine beetle infestation increased in Montana but decreased in Idaho. Extremely cold temperatures resulted in a marked reduction of successfully attacked trees in most areas. Size of the epidemic area increased in lodgepole, ponderosa, and whitebark pine stands on the Beaverhead, Gallatin, Flathead, and Kootenai NF's and remained static on the Lolo NF. A significant expansion occurred in Glacier and Yellowstone National Parks. Acreage figures represent area of visible faders, not area of infested green trees. Location of beetle activity is shown on map 1 (appendix).

More than 119,000 acres of lodgepole and whitebark pine are infested on the Madison Ranger District, Beaverhead NF, an increase of about 39,000 acres. The area contains about 13 infested trees per acre. Epidemic infestation increased in Centennial Valley north throughout tributaries of the Madison River and in the southern portion of the Tobacco Root Mountains. Mortality increased slightly in whitebark pine stands at higher elevations on the east side of the Madison River. A few "hot spots" still persist in susceptible stands in the Jack Creek drainage, but a decline in tree killing continues due to host depletion. Beetle populations will increase on much of the Forest in 1980.

Despite extremely cold temperatures, millions of lodgepole pine were killed on about 441,000 acres on the Hebgen Lake, Bozeman-Gallatin, Livingston, and Gardiner Ranger Districts, Gallatin NF. Newly attacked trees average 18 per acre. Mortality increased in whitebark pine stands at high elevations. The epidemic will expand on most Districts, but should remain the same on the Hebgen Lake District. Tree killing will decline in northern portions of the Bozeman-Gallatin District due to host depletion.

The massive infestation on the Flathead NF and in Glacier NP expanded, even though cold temperatures caused a decline in successfully attacked trees. Newly attacked trees averaged nearly 13 per acre on the Forest, and about 52 per acre in the Park. Infestations increased from about 164,000 to more than 215,000 acres in the Park, and from about 109,000 to 123,000 acres on nearby Forest, State, and private lands. Thousands of whitebark pine were killed on about 24,000 acres of the Glacier View Ranger District and on about 9,000 acres in the Park. Because beetle populations are so intense, the frequency of Engelmann spruce being successfully attacked and killed by mountain pine beetle has increased the past 3 years. Newly developing infestations are expanding on the Swan Lake, Hungry Horse, and Tally Lake Ranger Districts. Infestation on the Forest will expand for the next 3 to 5 years, with annual losses exceeding 80 mmbf per year. The infestation is spreading eastward in the Park and will increase in 1980.

1/ Common and scientific names of insects and disease causing agents used in this report are listed in the appendix.

Infestation increased in lodgepole and ponderosa pine types from nearly 30,000 to about 49,000 acres on the Kootenai NF. Although the numbers of infested trees per acre declined 50 percent, there are still 11 infested trees per acre. Most of the infestation, 33,000 acres, occurred on the Sylvanite Ranger District. Infestation also increased on the Rexford, Fortine, Libby, and Fisher River Ranger Districts. The trend is for increased tree killing throughout the Forest in 1980.

The infestation on the Plains Ranger District, Lolo NF, increased from about 11,000 acres in 1978 to 14,000 acres in 1979. Newly attacked trees averaged 30 per acre. In excess of 500,000 trees could be killed in 1980.

The size of the Yellowstone NP infestation increased by a factor of 2.5. Several million lodgepole and whitebark pines were killed on about 431,000 acres. Infestation will increase in 1980.

The infestation in second-growth ponderosa pine type declined from about 64,400 to 24,000 acres on the Lewis and Clark NF, Bureau of Land Management (BLM), State, and private lands, but nearly 24,000 trees were killed. Drought in 1979 may make trees more susceptible to beetle attack and result in increased tree mortality in 1980.

An average of 1 tree per acre was killed in second-growth ponderosa pine stands on 8,600 acres of BLM lands in the Judith Mountains north of Lewistown, Montana. Groups of faders ranged from 2,000 to 3,000 trees per group. Infestation may increase in 1980.

Several thousand ponderosa pine were killed on State and private lands in the Blackfoot River drainage east of Missoula, Montana. Infestation in second-growth ponderosa pine decreased in some portions of the Clark Fork River drainage east of Missoula, but stayed about the same in other areas. Infestation will increase in the Blackfoot and Clark Fork River drainages in 1980.

Outbreaks developed in lodgepole pine stands in a number of areas on the Deerlodge NF. Groups of 5 to 120 trees per group occurred. Tree killing will increase in 1980.

About 300 lodgepole pine were killed in small, widely scattered groups on nearly 300 acres near Elk City, Idaho, on the Nezperce NF. Tree mortality will increase in 1980.

Beetle populations decreased in lodgepole pine on BLM lands in the Craig Mountains south of Lewiston, Idaho. Thousands of trees were killed on more than 1,700 acres. The area contained about 14 infested trees per acre. The outbreak should remain static in 1980.

Infestations in second-growth ponderosa pine declined on the Bitterroot NF. About 1,600 trees were killed on about 1,600 acres of State and private lands. Infestation declined in lodgepole pine type in the Idaho Primitive Area, Magruder Ranger District. Drought conditions may stress trees and result in an increase in beetle-killed trees in 1980.

The infestation in second-growth ponderosa pine stands declined from about 7,000 to 1,700 acres on the Crow Indian Reservation in southeastern Montana, but the numbers of infested trees per acre increased from 7 to 39. Drought experienced earlier may stress these stands of overstocked and mature trees and result in an increase in beetle-killed trees in 198

About 13,000 lodgepole pine were sprayed with Sevimol-4® to protect them from mountain pine beetle attack in campgrounds and administrative sites on the Hebgen Lake Ranger District, Gallatin NF, and 600 lodgepole pine were sprayed in two campgrounds on the Tally Lake Ranger District, Flathead NF.

Douglas-fir Beetle

Beetle populations increased in overmature Douglas-fir stands in the south fork Clearwater and Selway River drainages on the Elk City and Fenn Ranger Districts, Nezperce NF, Idaho. There will be an increase in both tree mortality and infested acres in 1980.

The beetle killed several hundred trees that had been top killed and heavily defoliated by western spruce budworm the previous 7 to 8 years in Yellowstone NP near Gardiner, Montana. Tree mortality will increase in 1980.

Western Balsam Bark Beetle

The infested area increased from 6,300 to 7,900 acres. Major areas of tree kill occurred in high elevations stands on the Beaverhead, Gallatin, Flathead, and Lewis and Clark NF's, and in Yellowston NP.

Western Spruce Budworm

The budworm epidemic declined in northern Idaho and western Montana except on the Lolo and western portion of the Helena NF's. Defoliated areas increased east of the Continental Divide except in Yellowstone NP and the eastern portion of the Helena NF. The area of defoliation visible from the air decreased from about 2,520,000 to 2,271,000 acres (table 1 appendix). Location of air-visible defoliation is shown on map 2 (appe

Budworm egg mass survey data from localized areas on the Lolo, Helena, Beaverhead, and Custer NF's lead us to expect moderate to heavy defoliation in 1980 on all except the Lolo.

The PSW Forest and Range Experiment Station conducted a field experiment of aerially applied lannate, carbaryl, and imidan on the Lewis and Clar

PNW and PSW Experiment Stations field tested Bt 2/ and three chemical insecticides applied to individual trees with ground spray equipment on the Gallatin NF. A demonstration of foliage and cone protection by carbaryl and acephate applied with ground spray equipment was conducted on State land near Missoula, Montana.

Larch Casebearer

Many larch stands were defoliated by the larch casebearer in northern Idaho. Heaviest defoliation occurred near lakes and in major river drainages. Evaluations of casebearer parasites were not made.

Cone and Seed Insects

One seed orchard and 29 seed production areas were surveyed for cone and seed insects and their impacts assessed. Douglas-fir, grand-fir, western larch, Engelmann spruce, lodgepole pine, ponderosa pine, and western white pine were checked. In general, the cone crop was poor throughout the Region. Insect injury was extremely heavy as is usually the case during years of poor cone crops. Greatest losses to cones of Douglas-fir, grand fir, and western larch were caused by western spruce budworm, midges, and cone worms. Ponderosa pine were most severely damaged by cone worms. The mountain pine cone beetle was the primary pest of western white pine and destroyed nearly all the cone crop at the Sandpoint, Idaho, seed orchard.

Regeneration Pests

We surveyed 133 young plantations (5 to 15 years old) on the Lolo, Flathead, Clearwater, Bitterroot, and Idaho Panhandle NF's to determine causes of seedling mortality or injury. No one insect, or group of insects, caused significant injury to these age classes.

Forest Tent Caterpillar

Aspen stands in the Turtle Mountains of North Dakota have been severely defoliated by this caterpillar since 1976. Natural factors greatly reduced populations this year, and only widely scattered defoliation occurred east of Metiogoshe and Carpenter Lakes, mostly in 30- to 80-acre patches.

2/ A bacterium, Bacillus thuringiensis Berliner, used as a biological insecticide.

Sawflies in Western Larch

Two sawflies have been active in western larch stands in Montana and northern Idaho since 1977, but needle diseases have made aerial detecti of sawfly damage difficult. Nearly 14,000 acres were infested by sawflies on the Kaniksu portion of the Idaho Panhandle NF's. Damage occurred east of Priest Lake and south of Sandpoint, Idaho, and south o Newport, Washington. Larch casebearer and needle diseases are usually associated with sawfly damage.

Cankerworms

Cankerworms continued to defoliate Siberian elm shelterbelts in North Dakota. A 1978 demonstration of aerially applied Bt at one-half pound per acre showed continued substantial foliage protection.

Douglas-fir Tussock Moth

Tussock moth populations remain endemic in the Region. Pheromone baite sticky traps at 28 locations captured only a few male moths; numbers pe trap were too low to suggest epidemic populations next year.

A New Budworm

Larvae of this moth were discovered feeding on mountain hemlock and oth conifers in October 1978. They had heavily defoliated about 40 acres north of Wallace, Idaho. This year the infestation spread to about 1,5 acres and caused severe defoliation in sapling and pole-size hemlock an subalpine fir understory stands. Both current and old foliage was consumed. Current defoliation extends into Montana west of Noxon.

Pine Needle-Sheath Miner

Light defoliation by this moth occurred in a 16-mile long belt of ponde osa pine paralleling U.S. 91 south of Helena, Montana. The infestation covered about 18,000 acres.

Pine Butterfly

The pine butterfly outbreak that started in the early 70's in western Montana has ended. No defoliation was visible from the air, and only a relatively few adults were seen flying around crowns of ponderosa pines in previously infested areas.

Gouty Pitch Midge

Damage to young ponderosa pine trees by the gouty pine midge declined significantly. Only scattered injury to new shoots persists in northern Idaho.

A Needle Miner in Ponderosa Pine

This needle miner first defoliated 10,000 acres of ponderosa pine in western Montana in 1977. Although no defoliation occurred this year, larvae were collected west of Arlee and north of Frenchtown.

DISEASES

Winter Damage

Winter damage to conifers was widespread in northern Idaho and western Montana. Areas with severe damage include Priest Lake, Bull Lake, Libby, upper Lochsa River, and lower Blackfoot River. Discoloration frequency and severity varied by area, microsite, and species. In order of decreasing susceptiblity, trees affected were: western hemlock, western white pine, western red cedar, grand fir, ponderosa pine, and Douglas-fir. Lodgepole pine, subalpine fir, and Engelmann spruce were seldom affected. Small trees in openings were most severely affected.

Injury varied from a loss of a few needles to reddening of the entire crown. Unless other stress factors are imposed, most defoliated trees recover the following summer.

Snow Mold

Snow mold on Douglas-fir was locally prevalent throughout the Region for the first time. Initial symptoms were a slight yellowing or browning of several older age classes of needles in the lower crown in March and April. Affected needles remained on trees throughout the summer and turned brown or almost gray with several rows of small, dark brown fruiting bodies. Young trees with lower branches which had been covered by snow were most severely affected. Some growth loss, but little mortality will result from infection.

Douglas-fir Needle Blight

A needle pathogen occurred on Douglas-fir in the Libby and Columbia Falls areas of northwestern Montana. Symptom development was similar to that of the common Christmas tree blight which is normally seen in the spring and early summer on previous year's needles. In this case, several age classes of needles were affected, and the symptoms were not seen until mid-fall. The pathogen is closely related to the Christmas tree blight fungus.

Needle Casts

Lodgepole pine needle cast, although locally severe in north Idaho, was of generally light intensity in lodgepole pine in the remainder of the Region.

Another needle cast caused severe defoliation of whitebark pine on East Side Forests, particularly in the King's Hill area of the Lewis and Clark NF.

Discoloration of conifers caused by other needle pathogens remained static or declined. Most notable in the decline category was Meria needle cast on western larch and Dothistroma needle blight on ponderosa pine.

Nursery Diseases

At the Coeur d'Alene nursery, gray mold caused widespread and nearly complete defoliation of 2-0 western larch. In most instances seedlings were not killed, but put on new foliage and developed normally. Loss estimates are unavailable.

At the Coeur d'Alene nursery greenhouse and in other greenhouse operations in the Region, gray mold could be found causing defoliation, but apparently conditions necessary for serious losses were not reached. The most commonly affected species was western larch but a few 2-3 need pines occasionally had stems girdled.

Rodents

Rodents of some type girdled sapling-size western larch in thinned and unthinned stands on the Eureka Ranger District, Kootenai NF, Montana. As many as 25 percent of the residual stems in thinned areas had dead tops.

Other Diseases

Activity of dwarf mistletoes, stem and root decays, stem rusts, and cankers does not fluctuate significantly from year to year. Careful observations and measurements would have to be made to determine any changes.

APPENDIX

Common and scientific names of insects and disease causing agents used in this report.

Common Name	Scientific Name
INSECTS	
Cankerworms	Paleacrita vernata (Peck) Alsophila pometaria (Harris)
Coneworms	Dioryctria sp.
Douglas-fir beetle	Dendroctonus pseudotsugae Hopkins
Douglas-fir tussock moth	Orgyia pseudotsugata McDunnough
Forest tent caterpillar	Malacosoma disstria Hübner
Gouty pitch midge	Cecidomyia piniiopis Osten Sacken
Larch casebearer	Coleophora laricella (Hübner)
Midges	Contarinia sp.
Mountain pine beetle	Dendroctonus ponderosae Hopkins
Mountain pine cone beetle	Conophthorus monticolae Hopkins
New budworm	Argyrotaenia sp. near gogana (Kearfott)
Pine butterfly	Neophasia menapia (Felder & Felder)
Pine needle-sheath miner	Zelleria haimbachi Busck
Ponderosa pine needle miner	Coleotechmites sp.
Western balsam bark beetle	Dryocoetes confusus Swaine

Western larch sawflies	Anoplonyx sp. Pristiphora erichsonii (Hartig)
Western spruce budworm	Choristoneura occidentalis Freeman

DISEASE CAUSING AGENTS

Christmas tree blight	Rhabdocline pseudotsugae Syd.
Dothistroma needle blight	Scirrhia pini Funk & A.K. Parker
Douglas-fir needle blight	Rhabdocline weirii Parker & Reid
Gray mold	Botrytis cinerea Per. ex Fr.
Lodgepole pine needle cast	Lophodermella concolor (Dearn.) Darker
Meria needle cast	Meria laricis Vuill.
Snow mold	Phacidium infestans Karst.
Whitebark pine needle cast	Lophodermella arcuata (Darker) Darker

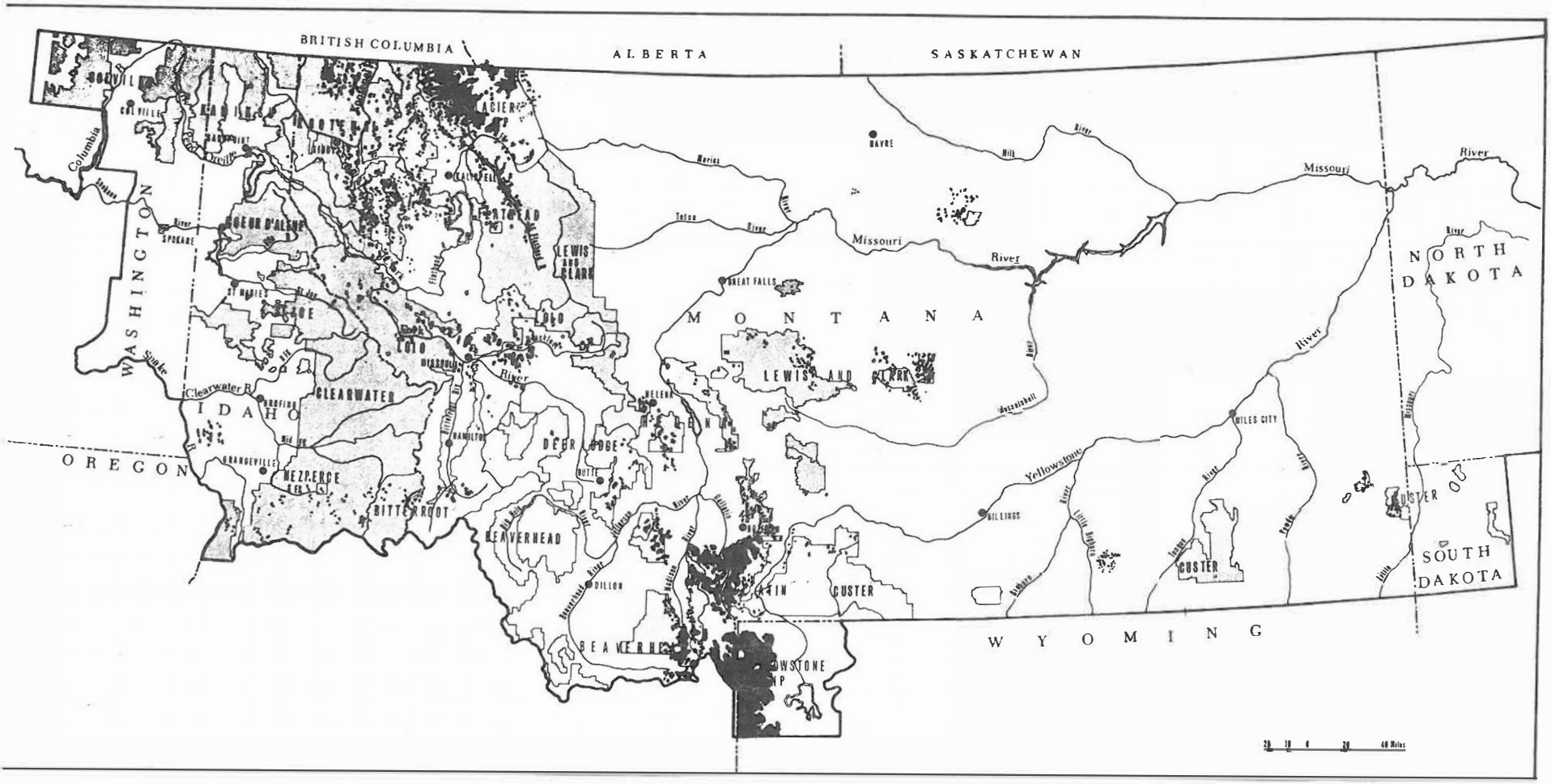
Table 1 - Acres of aerially visible 1/ western spruce budworm defoliation in the Northern Region in 1978 and 1979.

Unit 2/	Acres of Visible Defoliation		Changes in Size of Infestation
North Idaho	1978	1979	Area
	- - - - - - - - - - -Acres - - - - - - - - -		
Clearwater NF	8,115	0	- 8,115
Idaho Panhandle NF	7,416	0	- 7,416
Nezperce NF	4,590	0	- 4,590
Subtotal	20,121	0	-20,121
Montana			
Beaverhead NF	223,720	349,889	+126,169
Bitterroot NF 3/	379,112	95,332	-283,780
Custer NF	3,625	5,373	+ 1,748
Deerlodge NF	382,762	402,638	+ 19,876
Flathead IR	50,566	3,523	- 47,043
Flathead NF	15,171	1,803	- 13,368
Gallatin NF	293,265	325,921	+ 32,656
Helena NF	575,151	463,175	-111,976
Kootenai NF	14,604	1,438	- 13,166
Lewis & Clark NF	176,294	211,493	+ 35,199
Lolo NF	281,161	335,312	+ 54,151
Subtotal	2,395,431	2,195,897	
Wyoming			
Yellowstone NP	104,694	75,525	- 29,169
GRAND TOTAL	2,520,246	2,271,422	-248,824

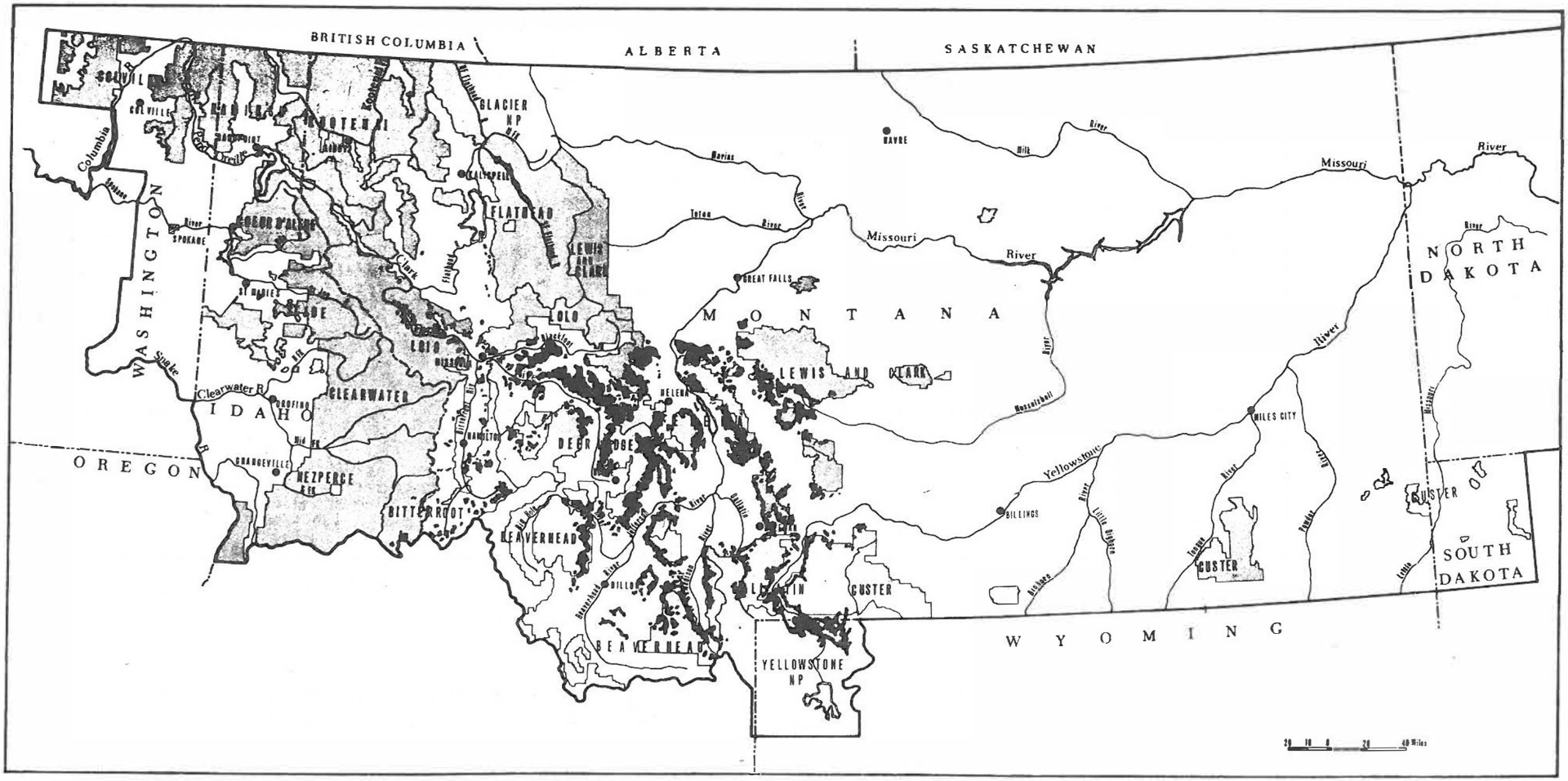
1/ Aerially visible defoliation occurs when 25 percent or more of current foliage is destroyed.

2/ Includes Federal, State, and private land.

3/ A portion of this Forest is in north Idaho. (About 10,000 acres in northern Idaho were defoliated in 1979 compared to about 35,000 in 1978.



Map 1.--Areas of mountain pine beetle infestation, Northern Region, 1979.



Map 2.--Western spruce budworm defoliation visible from the air in the Northern Region, 1979.